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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/724,803	11/28/2000	Gregory G. Cappiello	34013-28PT	7805
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HUNTON & WILLIAMS LLP INTELLECTUAL PROPERTY DEPARTMENT 1900 K STREET, N.W. SUITE 1200 WASHINGTON, DC 20006-1109				
			EXAMINER AMARI, ALESSANDRO V	
			ART UNIT 2872	PAPER NUMBER

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/724,803

Applicant(s)

CAPPIELLO ET AL.

Examiner

Alessandro V. Amari

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-145 is/are pending in the application.
- 4a) Of the above claim(s) 1-34, 40-45, 65-100, 106-111 and 132-145 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 35-39, 46-64, 101-105 and 112-131 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 October 2003 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 35 is rejected under 35 U.S.C. 102(e) as being anticipated by Hoose US Patent 6,487,019.

In regard to claim 35, Hoose teaches (see Figure 4) a diffraction grating, comprising a reflective material having a blazed surface with a blaze angle between about 27 degrees and about 39 degrees; and an optically transmissive material disposed adjacent the reflective material and having an index of refraction ( $n$ ) ( $n_{\text{air}} = 1.0$ ) wherein the blazed surface of the reflective material has approximately  $(500 \pm 110) * n$

number of grooves per millimeter such that the diffraction grating has an efficiency of at least 80% over at least one of the C-band and L-band wavelength ranges as shown in Figure 4.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 101 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al US Patent 5,748,815 in view of Hoose US Patent 6,487,019.

In regard to claim 101, Hamel et al does teach (see Figure 5) a wavelength division device, comprising a plurality of first coupling components (72, 74, 76, 78), each first component being capable of receiving a distinct carrier for carrying a signal; a second coupling component (68) disposed adjacent the first coupling components and capable of receiving a distinct carrier for carrying one or more signals; and a diffraction grating (70) optically coupled to each carrier received by the first and second coupling components and a diffraction grating optically coupled to each carrier received by the first and second coupling components as shown in Figure 5.

However, Hamel et al does not teach the diffraction grating having the specific blaze angles and groove densities claimed above.

In regard to claim 101, Hoose teaches (see Figure 4) a diffraction grating, comprising a reflective material having a blazed surface with a blaze angle between

about 27 degrees and about 39 degrees; and an optically transmissive material disposed adjacent the reflective material and having an index of refraction ( $n$ ) ( $n_{\text{air}} = 1.0$ ) wherein the blazed surface of the reflective material has approximately  $(500 \pm 110) * n$  number of grooves per millimeter such that the diffraction grating has an efficiency of at least 80% over at least one of the C-band and L-band wavelength ranges as shown in Figure 4.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the grating of Hoose in the device of Hamel et al in order to improve the multiplexer performance.

6. Claims 37, 46, 48, 50, 51, 53, 55, 56, 57, 58, 60, 61, 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoose US Patent 6,487,019.

In regard to claim 37, Hoose teaches the invention as set forth above but does not teach that the diffraction order associated with the lowest loss is the first order. Regarding claims 50, 55 and 60, Hoose teaches a substantially planar substrate on which the reflective material is formed as shown in Figure 7. In regard to claims 46, 51, 56, 57, 61, 62, Hoose teaches a blazed diffraction grating with an optically transmissive material and having an index of refraction ( $n$ ) ( $n_{\text{air}} = 1.0$ ) but does not teach the blaze angles and number of grooves per millimeter claimed. Regarding claims 48, 53, 58 and 63, Hoose does not teach the diffraction order claimed associated with the lowest loss.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation, since it has been held that discovering

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an optimum value of a result effective variable (i.e., diffraction efficiency) involves only routine skill in the art. One would have been motivated to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation for the purpose of optimizing diffraction efficiency over the claimed wavelength ranges. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)

7. Claims 49, 54, 59 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoose US Patent 6,487,019 in view of Blasiak et al US Patent 6,067,197.

Regarding claims 49, 54, 59 and 64, Hoose teaches the invention as set forth above but does not teach that the reflective material is at least one of the following: gold material, aluminum material and silver material. Blasiak et al teaches that the reflective material is aluminum as described in column 4, lines 11-15. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the reflective material as taught by Blasiak et al in the device of Hoose because of the high reflectivity that these materials exhibit thus improving grating performance.

8. Claims 36, 38, 39, 47 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoose US Patent 6,487,019 in view of Knop US Patent 4,426,130.

Regarding claims 36, 38, 39, 47 and 52, Hoose teaches the invention as set forth above but does not teach the blaze angles and grooves per millimeter recited in claims 36, 38, 39, 47 and 52.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the blaze angles and grooves per millimeter in accordance

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with the grating equation, since it has been held that discovering an optimum value of a result effective variable (i.e., diffraction efficiency) involves only routine skill in the art. One would have been motivated to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation in the device of Hoose for the purpose of optimizing diffraction efficiency over the claimed wavelength ranges. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)

Furthermore, Hoose does not teach that the index of refraction of the optically transmissive material is between about 1.44 and about 1.64.

Regarding claims 36, 38, 39, 47 and 52, Knop does teach that the index of refraction of the optically transmissive material is between about 1.44 and 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material of Knop having an index of refraction between about 1.44 and 1.64 in the device of Hoose in order increase the efficiency of the grating as described in column 1, lines 62-68 and column 2, lines 1-3.

9. Claims 103, 112, 113, 116, 117, 118, 121, 122, 123, 125, 126, 127, 128, 130 and 131 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al US Patent 5,748,815 in view of Hoose US Patent 6,487,019.

Regarding claims 103, 112, 113, 116, 117, 118, 121, 122, 123, 125, 126, 127, 128, 130 and 131, Hamel et al teaches (see Figure 5) a wavelength division device, comprising a plurality of first coupling components (72, 74, 76, 78), each first

component being capable of receiving a distinct carrier for carrying a signal; a second coupling component (68) disposed adjacent the first coupling components and capable of receiving a distinct carrier for carrying one or more signals; and a diffraction grating (70) optically coupled to each carrier received by the first and second coupling components and a diffraction grating optically coupled to each carrier received by the first and second coupling components as shown in Figure 5.

However, in regard to claims 103, 112, 113, 116, 117, 118, 121, 122, 123, 125, 126, 127, 128, 130 and 131, Hamel et al does not teach a diffraction grating with the blaze angles, orders and grooves per millimeter claimed.

Regarding claims 116, 121 and 126, Hoose teaches a substantially planar substrate on which the reflective material is formed as shown in Figure 7.

Regarding claims 103, 112, 113, 117, 118, 122, 123, 125, 127, 128, 130 and 131, Hoose teaches a blazed diffraction grating with an optically transmissive material and having an index of refraction ( $n$ ) ( $n_{\text{air}} = 1.0$ ).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the grating of Hoose in the device of Hamel in order to improve the multiplexer performance.

Furthermore, in regard to claims 103, 112, 113, 117, 118, 122, 123, 125, 127, 128, 130 and 131, Hamel et al in view of Hoose while teaching the invention as set forth above does not teach the blaze angles, diffraction orders and number of grooves per millimeter claimed.



It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation, since it has been held that discovering an optimum value of a result effective variable (i.e., diffraction efficiency) involves only routine skill in the art. One would have been motivated to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation in the combination of Hamel et al in view of Hoose for the purpose of optimizing diffraction efficiency over the claimed wavelength ranges. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)

10. Claims 114, 119, 124 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al US Patent 5,748,815 in view of Hoose US Patent 6,487,019 in view of Blasiak et al US Patent 6,067,197.

Regarding claims 114, 119, 124 and 129, Hamel et al in view of Hoose teaches the invention as set forth above but does not teach that the reflective material is at least one of the following: gold material, aluminum material and silver material. Blasiak et al teaches that the reflective material is of aluminum as described in column 4, lines 11-

15. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the reflective material as taught by Blasiak et al in the combination of Hamel in view of Hoose because of the high reflectivity that these materials exhibit thus improving grating performance.

11. Claims 102, 104, 105, 115 and 120 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al US Patent 5,748,815 in view of Hoose US Patent 6,487,019 in view of Knop US Patent 4,426,130.

Regarding claims 102, 104, 105, 115 and 120, Hamel et al in view of Hoose teaches the invention as set forth above but does not teach the blaze angles and grooves per millimeter recited in claims 102, 104, 105, 115 and 120.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to vary the blaze angles and grooves per millimeter in accordance with the grating equation, since it has been held that discovering an optimum value of a result effective variable (i.e., diffraction efficiency) involves only routine skill in the art. One would have been motivated to vary the blaze angles and grooves per millimeter and diffraction orders in accordance with the grating equation in the combination of Hamel et al in view of Hoose for the purpose of optimizing diffraction efficiency over the claimed wavelength ranges. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)

Furthermore, Hamel et al in view of Hoose does not teach that the index of refraction of the optically transmissive material is between about 1.44 and about 1.64.

Regarding claims 102, 104, 105, 115 and 120, Knop does teach that the index of refraction of the optically transmissive material is between about 1.44 and 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material of Knop having an index of refraction between about 1.44 and 1.64 in the combination of Hamel et al in

view of Hoose in order increase the efficiency of the grating as described in column 1, lines 62-68 and column 2, lines 1-3.

***Response to Arguments***

12. Applicant's arguments with respect to claims 35-39,46-64,101-105 and 112-131 have been considered but are moot in view of the new ground(s) of rejection.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava *ava*  
19 March 2004

  
MARK A. ROBINSON  
PRIMARY EXAMINER